

Physical Changes During Pregnancy



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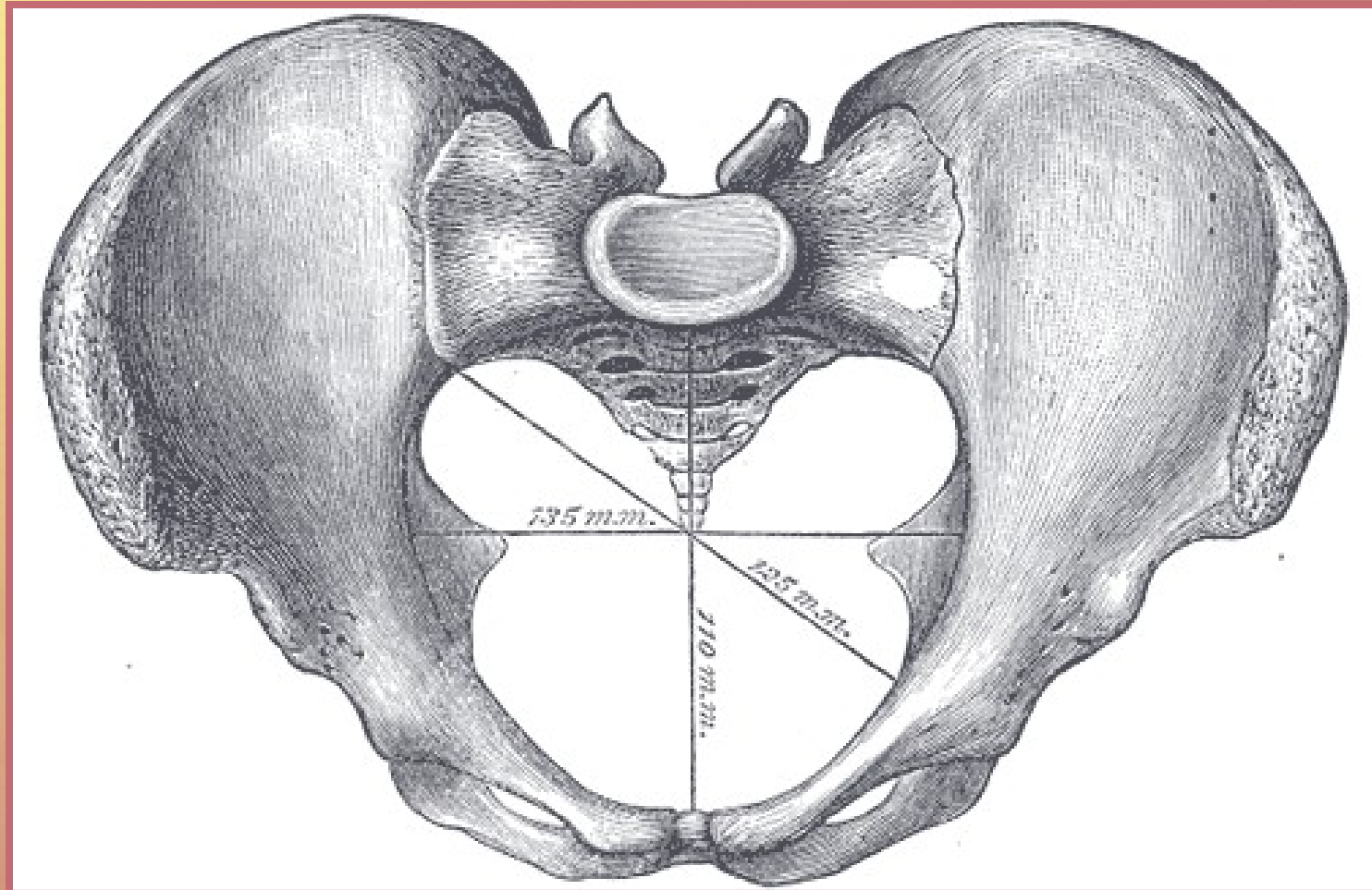
Anatomical Changes

- * **Pelvis**
- * **Pelvic Floor Muscles**
- * **Uterus**
- * **Uterine Ligaments**
- * **Cervix**
- * **Placenta**
- * **Amniotic Fluid**

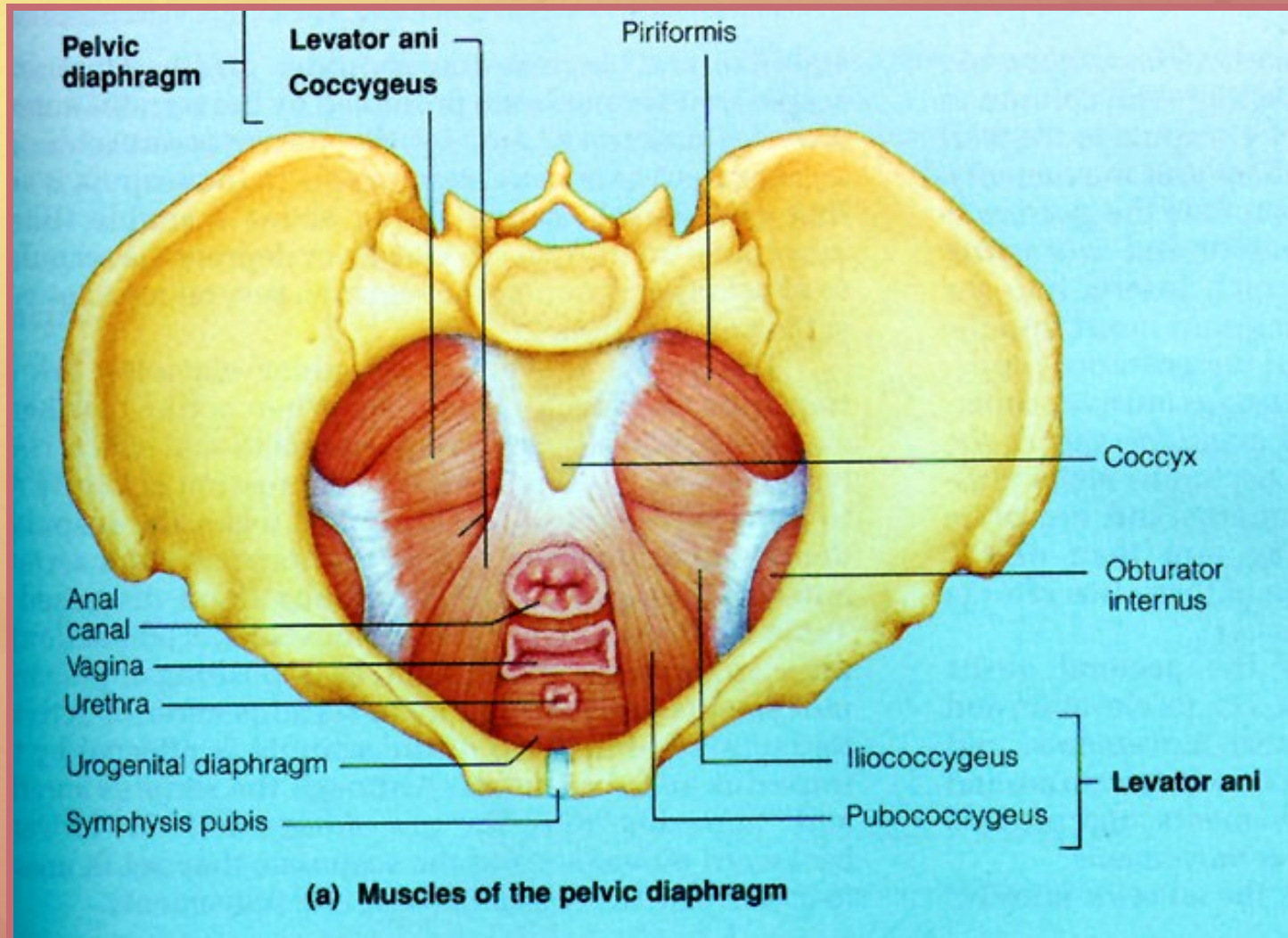




Pelvis



Pelvic Floor Muscles





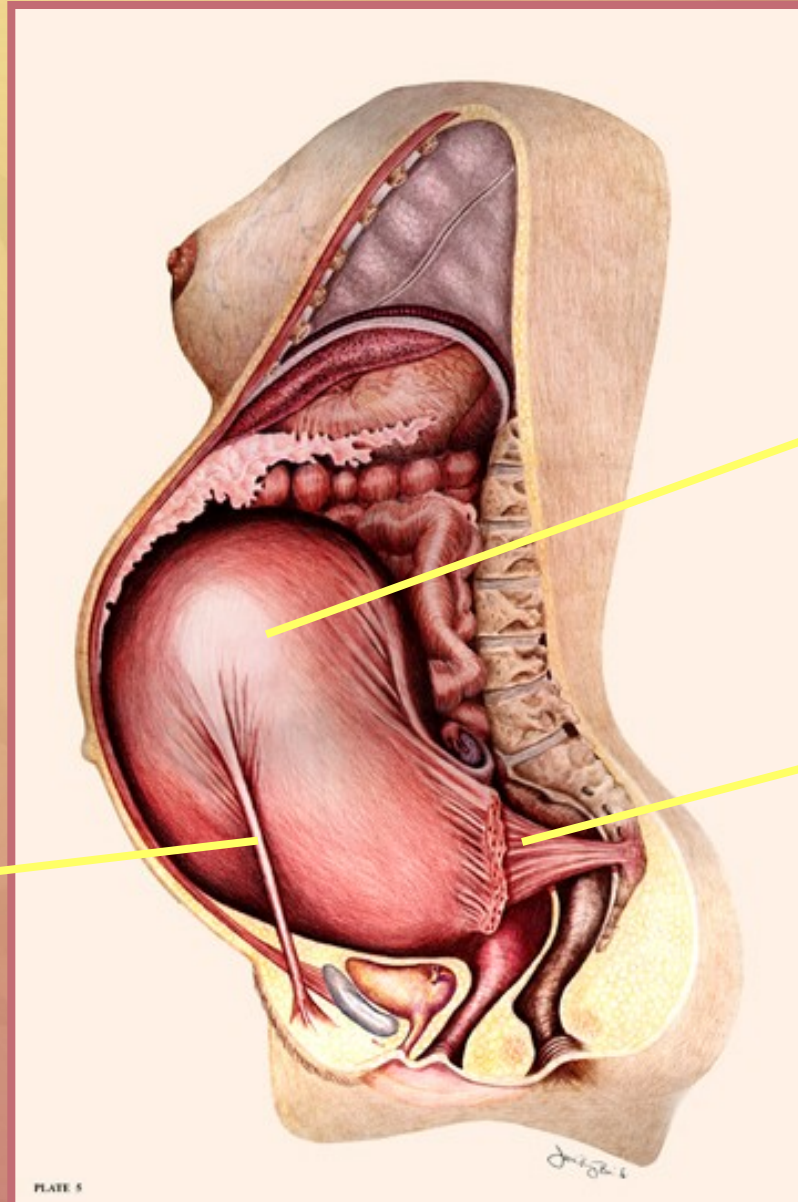
Pelvic Floor Muscle Functions

- * Maintain alignment and support of internal organs**
- * Control of urine flow**
- * Sexual enhancement**
- * Eliminate waste from rectum**
- * Improve recovery from episiotomy**





Uterus & Uterine Ligaments



**Round
ligame
nt**

**Uteru
s**

**Broad
ligame
nt**

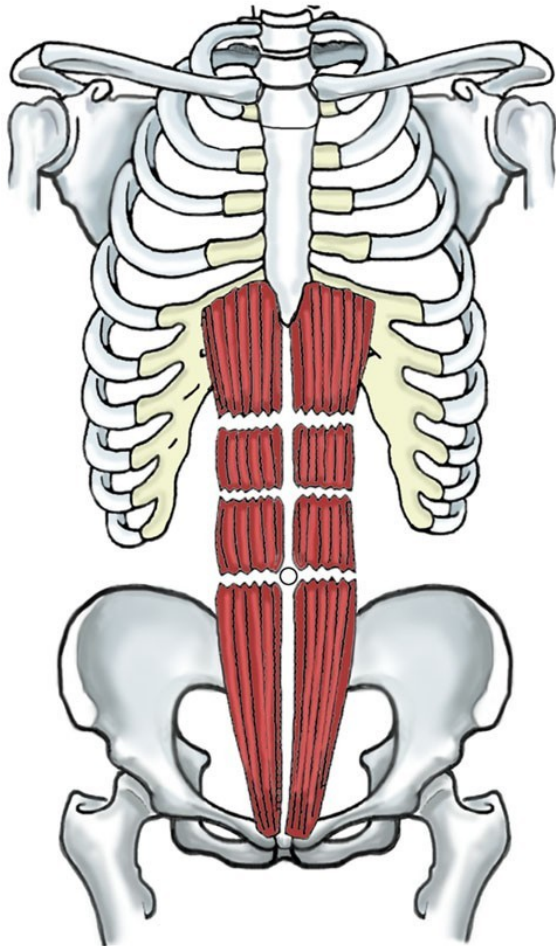




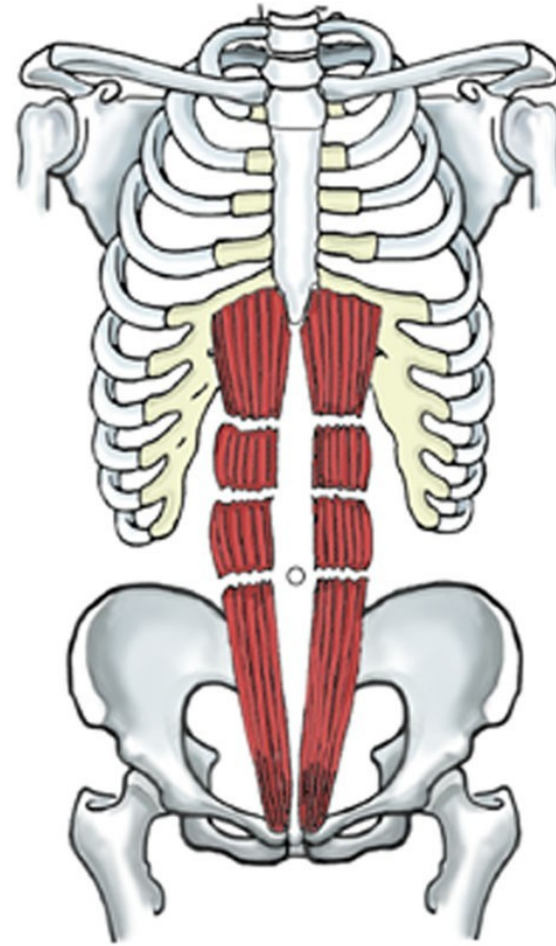
Diastasis Recti



Abdominal Diastasis



Normal

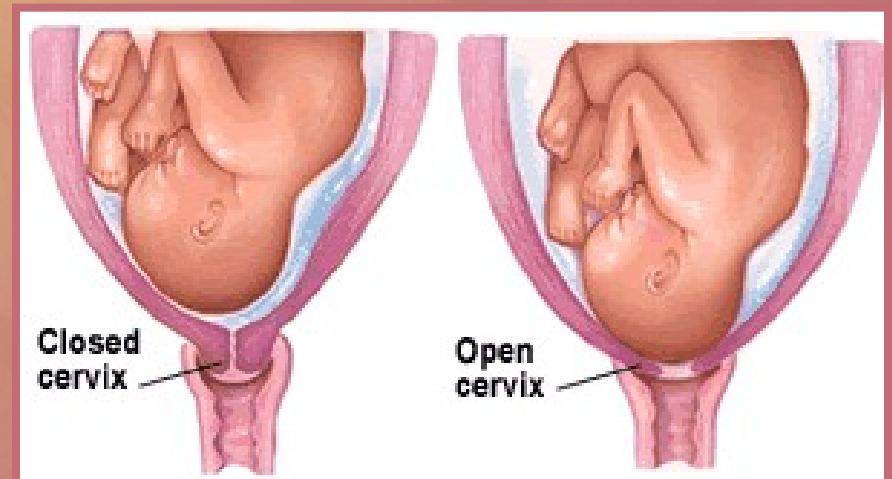
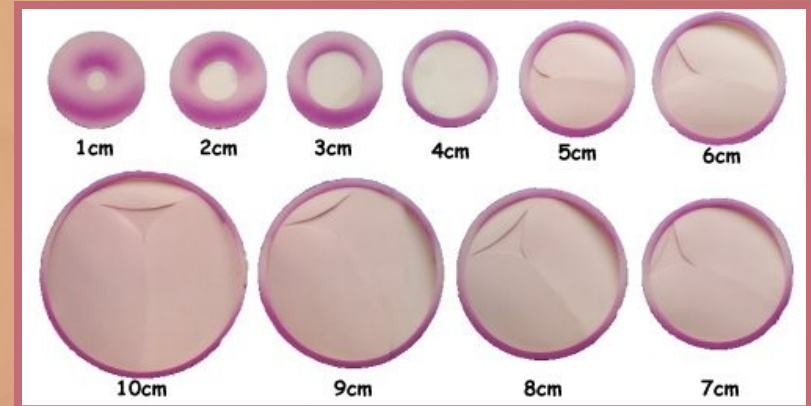


Diastasis



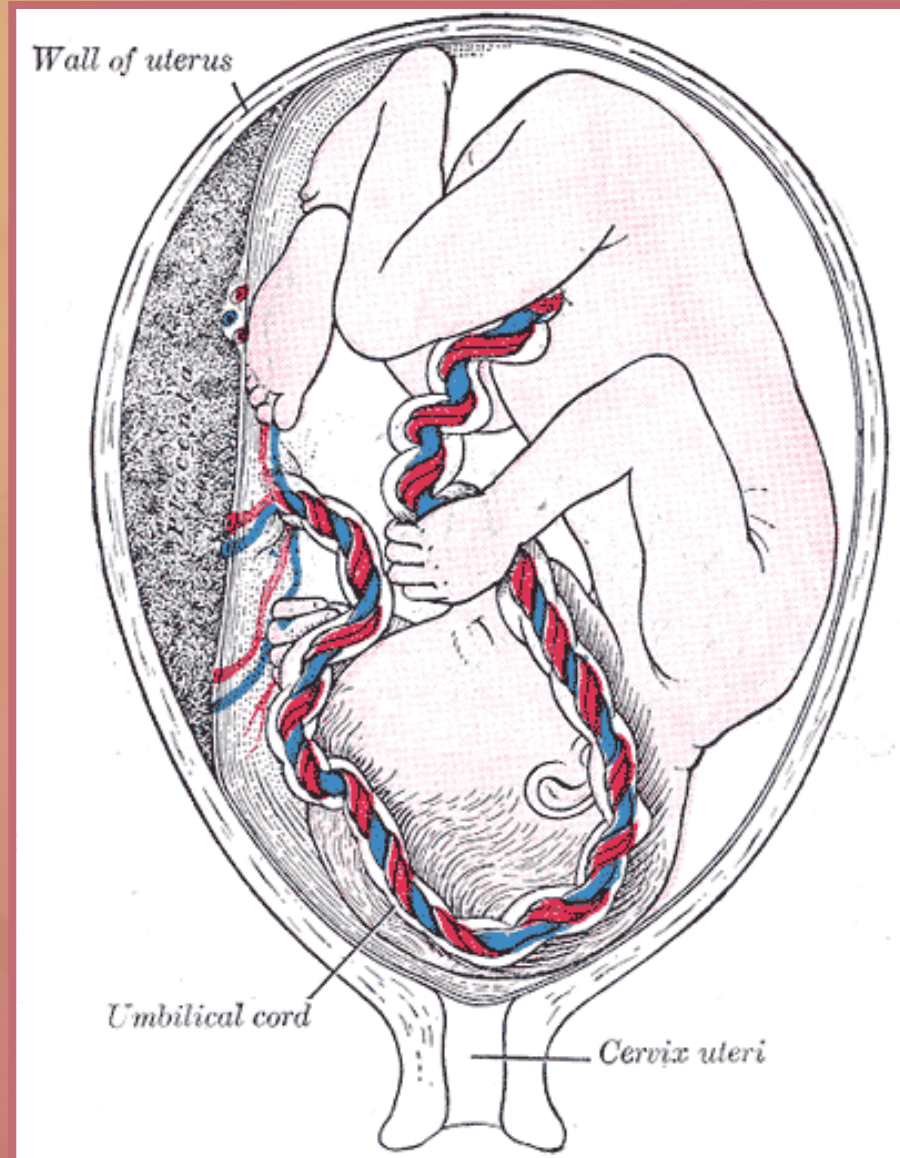
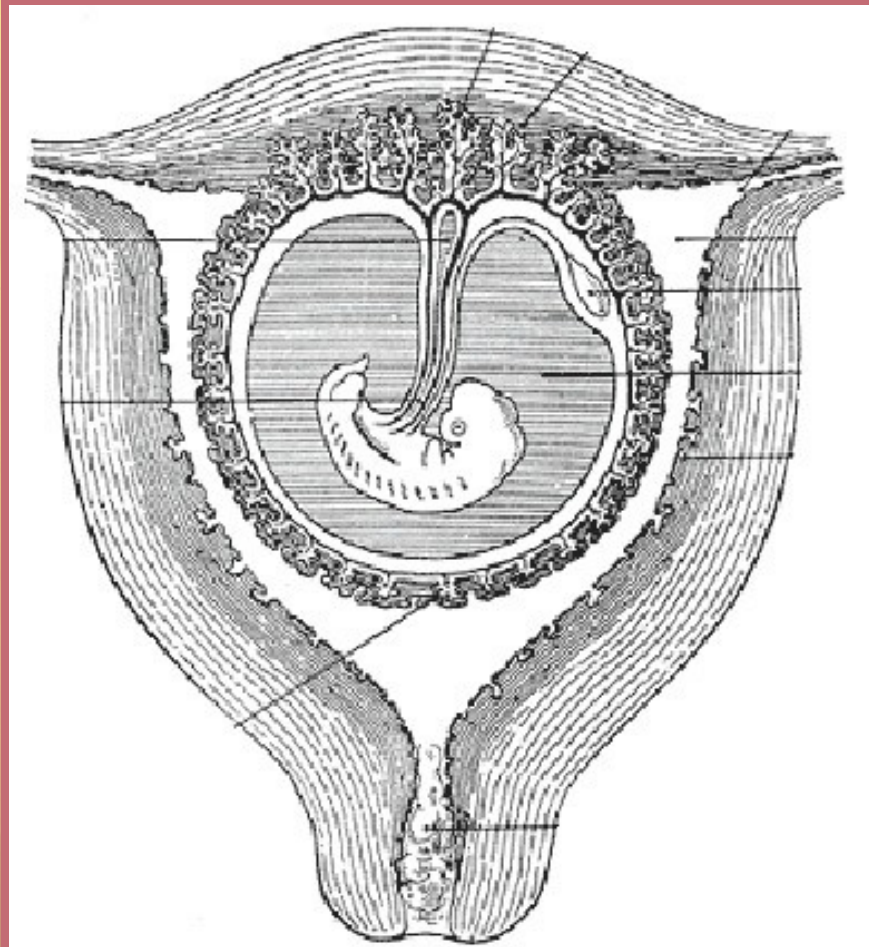
Cervix

- * **Becomes softer**
- * **Has more blood supply**
- * **Forms a mucus plug**
- * **Becomes about 12 X weaker by term**



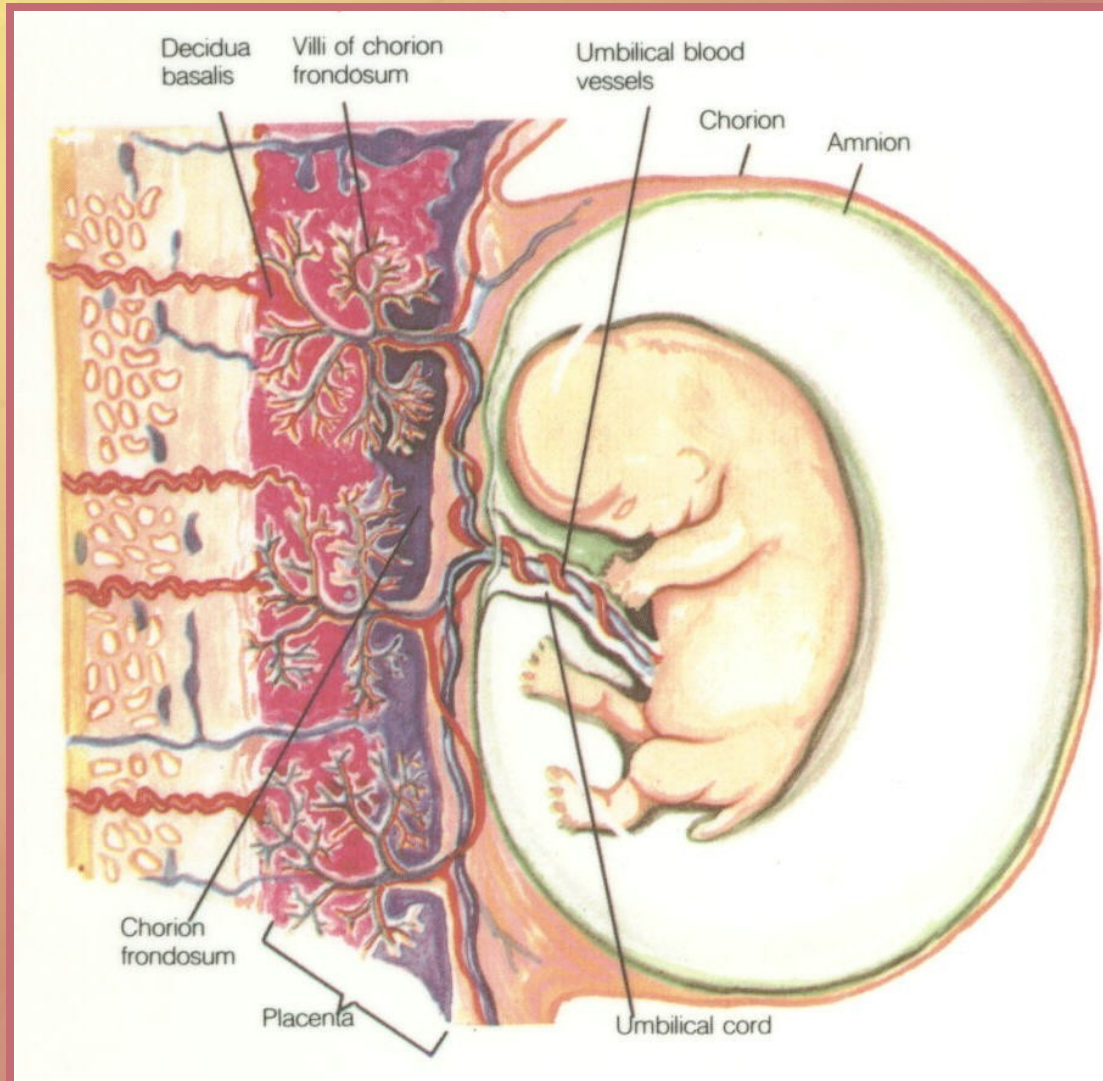


Placenta





Amniotic Sac & Fluid





Physiological Changes

* **Circulatory**

* **Urinary**

* **Thermoregulation**

* **Skin**

* **Breasts**

* **Metabolic**

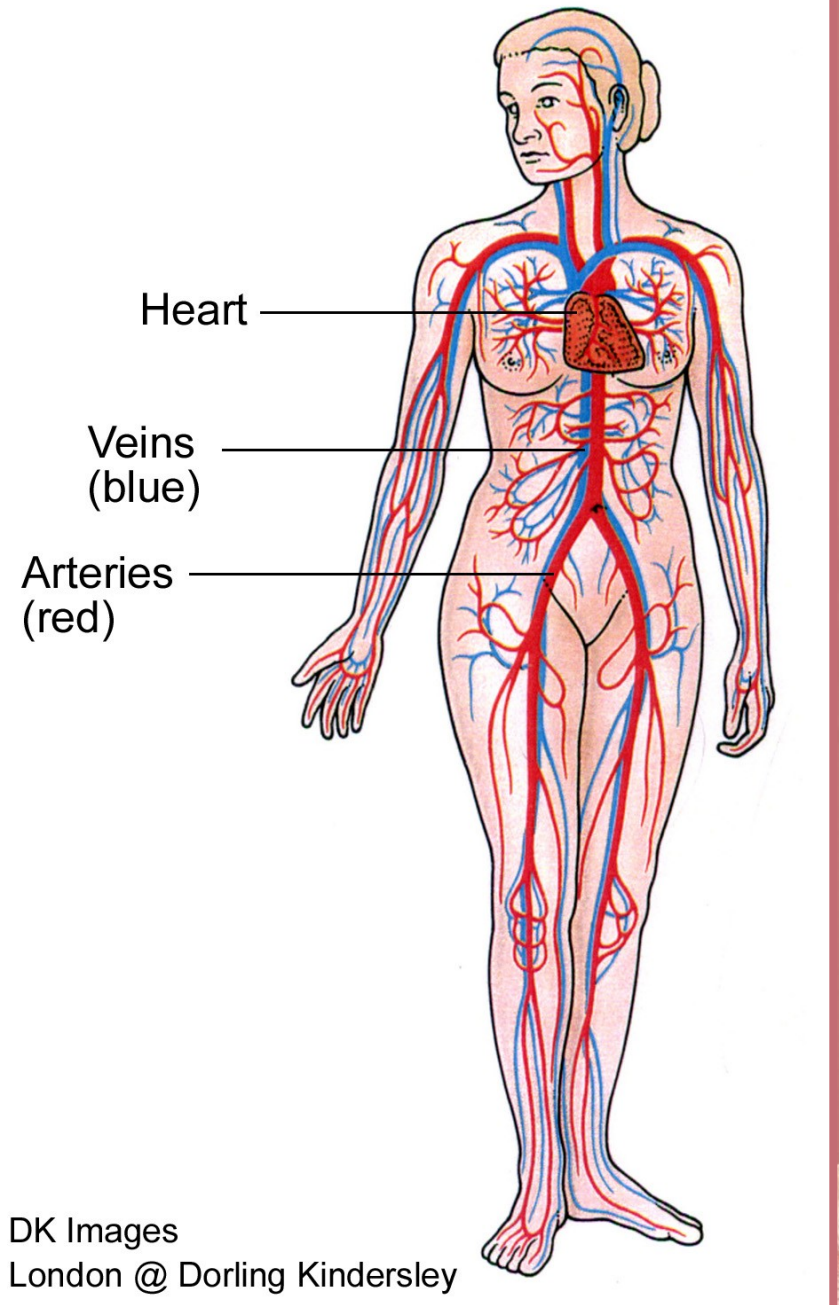
* **Biomechanical**

* **Respiratory**

* **Digestive**



Circulatory System





Cardiovascular Changes

INCREASE

- * **Blood volume**
- * **Cardiac (heart) output**
- * **Stroke volume**
- * **End diastolic volume**
- * **Resting pulse**
- * **% of blood plasma**

DECREASE

- * **Hematocrit**
- * **Blood pressure**
- * **Blood supply to uterus**
- * **Cardiac reserve**
- * **Vascular resistance**





Orthostatic Hypotensive Syndromes

- * **Avoid supine position**
- * **Do strength exercises prior to aerobic exercise**
- * **Limit aerobic exercise to 20 - 45 minutes**
- * **Do thorough cool-down**
- * **Rest daily in the side-lying position**



Thermoregulation

**Metabolic storage
in body core**

CONDUCTION
Contracting
muscle works

**Excess body heat is
transferred to the
environment and body
core temperature is
regulated.**



EVAPORATION
Sweat &
respiration

CONVECTION
Skin & blood
Muscle blood flow

RADIATION
Skin & air



Adaptations for Protection

- * **Core temperature falls**
- * **Perspire more rapidly**
- * **Greater skin area and increased blood vessels allow added evaporation**
- * **Increased ventilation promotes cooling**
- * **Enhanced regulation of internal temperature in consistent exerciser**





WATER, WATER, WATER

Hydration is a major concern during maternal exercise.

- * **Provide a ready source of water**
- * **Encourage frequent water breaks**





Metabolic Changes

INCREASES IN:

- * Insulin level**
- * Carbohydrate utilization during exercise as weight increases**
- * Estrogen**
- * Progesterone**
- * Relaxin**
- * Caloric requirements by ~ 300 calories/day**
- * Protein and fluid requirements**





Weight Gain & Exercise

- * **Continuous and regular**
- * **Recreational exercise**
- * **Sustained throughout pregnancy**
- * **Cardiovascular conditioning level**

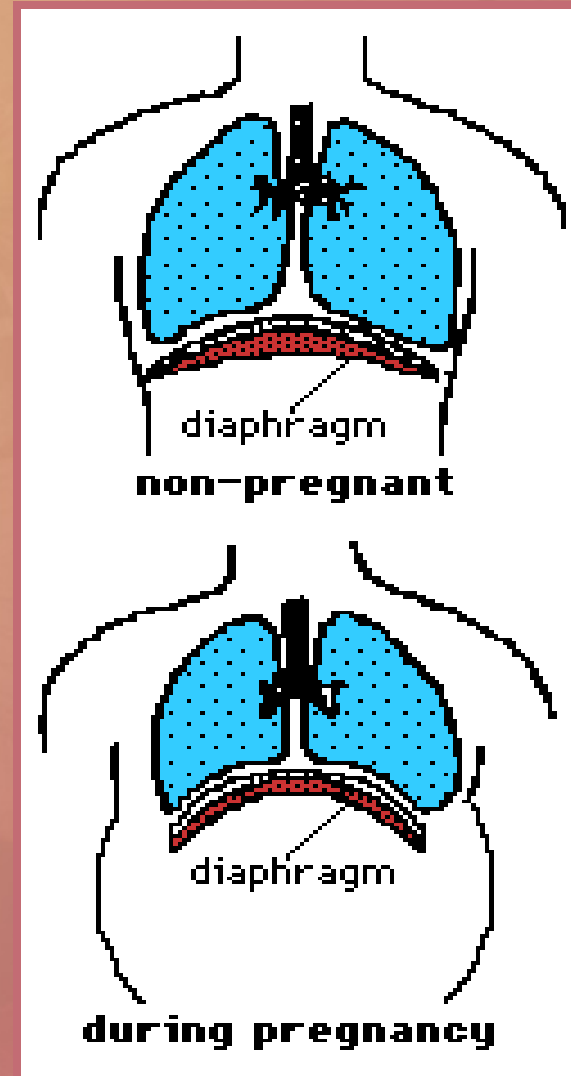


- * **Gain less weight**
- * **Deposit less body fat**
- * **Leaner babies**



Respiratory Changes

- * **Respiratory capacity increases**
- * **Shortness of breath**
- * **Pulmonary reserve decreases**
- * **Increased risk of muscle soreness**
- * **Tendency to hyperventilate**



RESULT ➡

adjust the intensity level and duration of exercise



Digestive Changes

- * **Digestive system slows down**
- * **Intestines are pushed up and to the sides**
- * **Smooth muscle of the stomach relaxes and can cause heartburn**
- * **Constipation and hemorrhoids are common during pregnancy**
- * **Morning sickness**





Urinary Changes

- * **Kidneys grow and filter more blood as the blood volume increases**
- * **Become more susceptible to bladder and kidney infections**
- * **Bladder becomes compressed causing frequent urination and incontinence**





Skin Changes

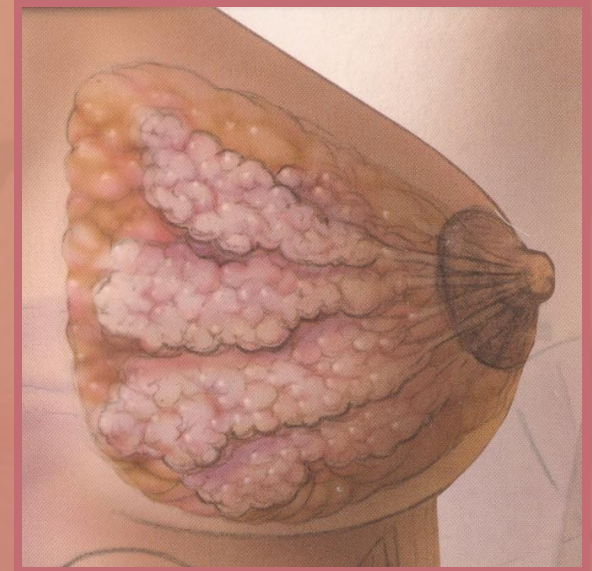
- * **Stretch marks**
- * **Dark pigmented line on there abdomen which is called Linea Nigra**
- * **Pigment changes on their face and neck**
- * **Small blood vessels in the face, neck and upper chest**
- * **MOST OF THESE RESOLVE AFTER PREGNANCY**





Breast Changes

- ❁ **Early in pregnancy, tenderness and tightness is common**
- ❁ **After 8 weeks, breasts grow and blood vessels often are visible**
- ❁ **Nipples become larger and darker**
- ❁ **A thick yellowish fluid can be expressed from the nipple**





Biomechanical Changes

- * **Weight distribution shifts**
- * **Joint movement**
- * **Balance of muscle strength**
- * **Spinal curves increase**
- * **Joint laxity becomes greater**
- * **More structural discomfort**
- * **Increased potential for nerve compression**





Potential for Injury



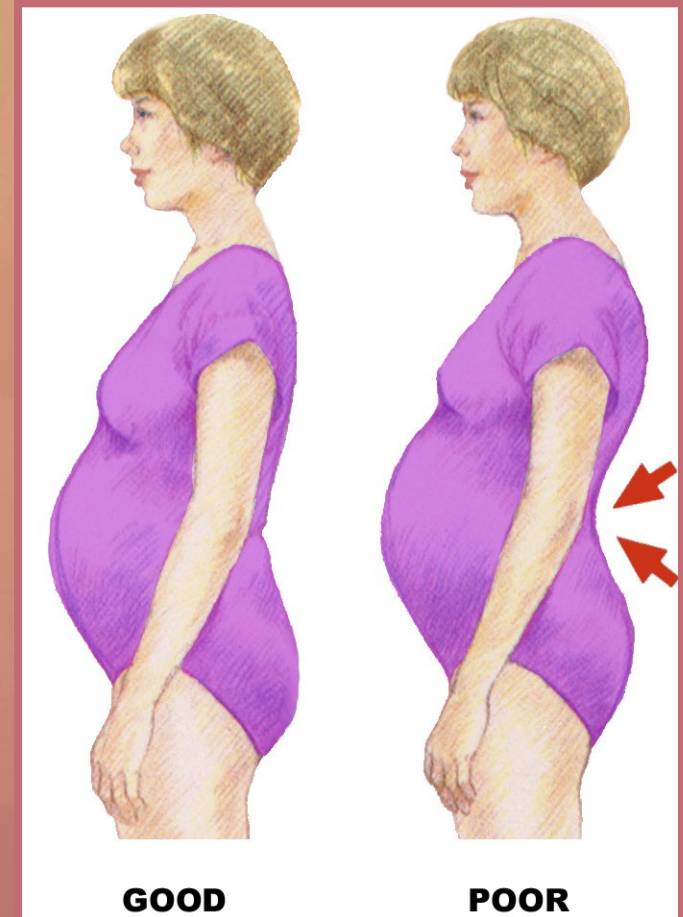
- * **Nerve compression syndromes**
- * **Low back discomforts or pelvic pain**
- * **Upper back fatigue**
- * **Lower extremity**
- * **Pelvic floor function**





Postural Dynamics

- * **Increased curve of the waist**
- * **Top of pelvis tilts forward**
- * **More flexion in the hip joint**
- * **Increased hunching in the upper back and neck**
- * **Tailbone is pushed back**





Muscles Affected

- * **Overstretching & weakening of gluteal muscles & hamstrings**
- * **Overstretching & weakening of abdominal muscles & pelvic floor**
- * **Overstretching & weakening of upper back muscles**
- * **Shortening and tightening of low back & hip flexors muscles**
- * **Shortening of upper back flexors & pectoral muscles**





Combat Effects of Gravity/ Hormones

- * **Do pelvic tilts**
- * **Alter the stance**
- * **Shorten the jog stride**
- * **Lower or eliminate the step in aerobics**
- * **Avoid rapid leg abduction**
- * **Avoid breast stroke kick in swimming**
- * **Recognize tolerance for activities will vary**
- * **Do pelvic floor exercises to prevent trauma**
- * **Emphasize strengthening & stretching exercises**
- * **Wear abdominal support/ sports bra when exercising for support**





Changes to Body System

* First Trimester

- ! Baby begins to grow
- ! Increased urination
- ! Changes with skin and hair
- ! Thickening waistline
- ! Nausea/fatigue

* Second Trimester

- ! Baby's weight increases
- ! Energy level improves
- ! Heartburn
- ! Leg cramps
- ! Pelvis relaxes causing SI discomfort

* Third Trimester

- ! Baby has more rapid growth & weight gain
- ! Backaches
- ! Swelling of the hands, legs, and feet
- ! Breathlessness
- ! More frequent urination





Acknowledgements

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